plurality of phases. For example, the camera **300** may emit IR signals having phases of 0 degrees, 90 degrees, 180 degrees, and 270 degrees.

**[0061]** In operation **420**, the camera **300** may receive reflected signals, i.e., the IR signals reflected from the object.

**[0062]** In operation **430**, the camera **300** may generate an IR image by using the reflected signals, determine the saturation or unsaturation of the IR image, and control the light intensity of the light source. The camera **300** may determine whether the IR image is saturated. For example, the camera **300** may determine a pixel as a saturated pixel when a pixel value thereof in the IR image is greater than a first threshold value, and determine that the IR image is saturated when the number of saturated pixels is greater than a second threshold value. The camera **300** may reduce the light intensity of the light source when it is determined that the IR image is saturated, and may increase the light intensity of the light source when it is determined that the IR image is unsaturated.

**[0063]** FIG. **5** is a configuration diagram of a camera **500** according to an exemplary embodiment. Referring to FIG. **5**, the camera **500** may include a receiver **510**, a processor **520**, and a light source **530**.

**[0064]** The light source **530** may emit light. For example, the light source **530** may output an IR signal, an ultraviolet (UV) signal, or the like to the receiver. The emitted light may be reflected from an object located around the camera **500**.

**[0065]** The receiver **510** may receive a signal carried by the light reflected from the object.

**[0066]** The processor **520** may receive the signal from the receiver **510** and generate an image based on the signal. For example, the processor **520** may generate an IR image based on the IR signal.

**[0067]** The processor **520** may set a reference pixel value for determining the saturation or unsaturation of the IR image. When pixel values of some of all pixels of the IR image are greater than the reference pixel value, the processor **420** may determine that the IR image is saturated. The processor **520** may count the number of saturated pixels, which have pixel values that are greater than the reference pixel value. When the number of saturated pixels is greater than a certain threshold value, the processor **520** may determine that the IR image is saturated.

**[0068]** The processor **520** may control the light source **530**. For example, the processor **520** may gradually reduce or increase the light intensity of the light source **530** up to a maximum light intensity at which the IR image is unsaturated. The processor **520** may reduce the light intensity of the light source **530** when it is determined that the IR image is saturated, and may increase the intensity of the light source **530** when it is determined that the IR image is unsaturated. The light intensity of the light source **530** may be adjusted to be one of a plurality of levels. For example, the light intensity of the light source **530** may range from a first level to a fourth level. The processor **520** may gradually increase the light intensity of the light source **530** from the first level to the fourth level, or may gradually reduce the light intensity of the light source **530** from the fourth level to the first level. Details will be described below with reference to FIG. **7**.

**[0069]** As another example, when it is determined that the IR image is saturated, the processor **520** may reduce the light intensity of the light source **530** to the lowest level and gradually increase the light intensity of the light source **530** up to the maximum light intensity at which the IR image is unsaturated. For example, when the IR image is saturated when the light intensity of the light source **530** is at the fourth level, the processor **520** may reduce the light intensity of the light source **530** to the first level, generate an IR image, and determine whether the IR image is saturated. When the IR image is unsaturated when the light intensity of the light source **530** is at the first level, the processor **520** may gradually increase the light intensity of the light source **530** and determine whether the IR image is saturated. Details will be described below with reference to FIG. **8**.

**[0070]** As another example, when it is determined that the IR image is saturated, the processor **520** may reduce the light intensity of the light source **530** to the lowest level and determine an optimal light intensity of the light source **530** based on a saturation degree of the IR image. The processor **520** may determine the light intensity of the light source **5230** based on the number of saturated pixels in the IR image. Details will be described below with reference to FIG. **9**.

**[0071]** The light source **530** may emit four IR signals having different phases. The processor **520** may determine the saturation or unsaturation of the generated image by using at least one of the four phases. For example, the light source **530** may emit IR signals having phases of 0 degrees, 90 degrees, 180 degrees, and 270 degrees. The processor **520** may generate an image by using reflected signals having four phases, but may determine the saturation or unsaturation of the image by using one signal of the four reflected signals.

**[0072]** For example, in a case where the camera **500** is a camera using a global shutter method, the processor **520** may determine the saturation or unsaturation of the generated image by using a frame corresponding to a phase of 0 degrees.

**[0073]** As another example, in a case where the camera **500** is a camera using a rolling shutter method, the processor **520** may determine the saturation or unsaturation of the generated image by using two or more frames corresponding to a phase of 0 degrees. In the case of the rolling shutter method, a light source phase and a frame may not match each other. Therefore, a plurality of frames may be needed for generating an image corresponding to one light source phase.

**[0074]** FIG. **6** is a configuration diagram of a camera **600** according to another exemplary embodiment. The camera **600** may include a processor **610**, a voltage/current (V/I) controller **620**, a driver **630**, a diode **640**, a memory **660**, an image sensor **670**, and a lens **680**. The image sensor **670** and the lens **680** may be included in the receiver **510** of FIG. **5**. The V/I controller **620**, the driver **630**, and the diode **640** may be included in the light source **530** of FIG. **5**.

**[0075]** The processor **610** may output a signal to the V/I controller **620** so as to control a magnitude of a voltage or a current output by the V/I controller **620**. As described above with reference to FIG. **5**, the processor **610** may determine whether to increase or reduce the magnitude of the voltage or the current output by the V/I controller **620** according to the saturation or unsaturation of the IR image.

**[0076]** The V/I controller **620** may output the voltage or the current. The V/I controller **620** may output the voltage or the current, which is determined by the processor **610**, to the driver **630**.